

(3) Any oxygen sensor is replaced with a deteriorated or defective oxygen sensor, or an electronic simulation of such, resulting in exhaust emissions exceeding 1.5 times the applicable standard for NMHC, CO or NO_x.

(4) A vapor leak is introduced in the evaporative and/or refueling system (excluding the tubing and connections between the purge valve and the intake manifold) greater than or equal in magnitude to a leak caused by a 0.040 inch diameter orifice, or the evaporative purge air flow is blocked or otherwise eliminated from the complete evaporative emission control system.

(5) A malfunction condition is induced in any emission-related powertrain system or component, including but not necessarily limited to, the exhaust gas recirculation (EGR) system, if equipped, the secondary air system, if equipped, and the fuel control system, singularly resulting in exhaust emissions exceeding 1.5 times the applicable emission standard for NMHC, CO or NO_x.

(6) A malfunction condition is induced in an electronic emission-related powertrain system or component not otherwise described above that either provides input to or receives commands from the on-board computer resulting in a measurable impact on emissions.

[64 FR 23925, May 4, 1999, as amended at 65 FR 6853, Feb. 10, 2000; 69 FR 18803, Apr. 9, 2004; 71 FR 51488, Aug. 30, 2006]

§ 86.1806-04 On-board diagnostics.

This § 86.1806-04 includes text that specifies requirements that differ from § 86.1806-01. Where a paragraph in § 86.1806-01 is identical and applicable to § 86.1806-04 this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.1806-01.”

(a)-(g). [Reserved]. For guidance see § 86.1806-01.

(h) Reference materials. The OBD system shall provide for standardized access and conform with the following Society of Automotive Engineers (SAE) standards and/or the following International Standards Organization (ISO) standards. The following documents are incorporated by reference, see § 86.1:

(1) SAE material. (i) SAE J1850 “Class B Data Communication Network Interface,” (Revised, May 2001) shall be used as the on-board to off-board communications protocol. All emission related messages sent to the scan tool over a J1850 data link shall use the Cyclic Redundancy Check and the three byte header, and shall not use inter-byte separation or checksums.

(ii) Basic diagnostic data (as specified in §§ 86.094-17(e) and (f)) shall be provided in the format and units in SAE J1979 “E/E Diagnostic Test Modes—Equivalent to ISO/DIS 15031-5:April 30, 2002”, (Revised, April 2002).

(iii) Diagnostic trouble codes shall be consistent with SAE J2012 “Diagnostic Trouble Code Definitions—Equivalent to ISO/DIS 15031-6:April 30, 2002”, (Revised, April 2002).

(iv) The connection interface between the OBD system and test equipment and diagnostic tools shall meet the functional requirements of SAE J1962 “Diagnostic Connector—Equivalent to ISO/DIS 15031-3:December 14, 2001” (Revised, April 2002).

(v) All acronyms, definitions and abbreviations shall be formatted according to SAE J1930 “Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms” Equivalent to ISO/TR 15031-2:April 30, 2002”, (Revised, April 2002).

(vi) All equipment used to interface, extract and display OBD-related information shall meet SAE J1978 “OBD II Scan Tool” Equivalent to ISO 15031-4:December 14, 2001”, (Revised, April 2002).

(vii) As an alternative to the above standards, heavy-duty vehicles may conform to the specifications of the SAE J1939 series of standards (SAE J1939-11, J1939-13, J1939-21, J1939-31, J1939-71, J1939-73, J1939-81).

(2) ISO materials. Copies of these materials may be obtained from the International Organization for Standardization, Case Postale 56, CH-1211 Geneva 20, Switzerland.

(i) ISO 9141-2 “Road vehicles—Diagnostic systems—Part 2: CARB requirements for interchange of digital information,” (February 1, 1994) may be used as an alternative to SAE J1850 as

the on-board to off-board communications protocol.

(ii) ISO 14230-4:2000(E) "Road vehicles—Diagnostic systems—KWP 2000 requirements for Emission-related systems", (June 1, 2000) may also be used as an alternative to SAE J1850.

(iii) ISO 15765-4.3:2001 "Road Vehicles-Diagnostics on Controller Area Network (CAN)—Part 4: Requirements for emission-related systems", (December 14, 2001) may also be used as an alternative to SAE J1850.

(i) [Reserved]. For guidance see § 86.1806-01.

(j) *California OBDII compliance option.* For light-duty vehicles, light-duty trucks, and heavy-duty vehicles weighing 14,000 pounds GVWR or less, demonstration of compliance with California OBD II requirements (Title 13 California Code of Regulations § 1968.2 (13 CCR 1968.2)), as modified, approved and filed on April 21, 2003, shall satisfy the requirements of this section, except that compliance with 13 CCR 1968.2(e)(4.2.2)(C), pertaining to 0.02 inch evaporative leak detection, and 13 CCR 1968.2(d)(1.4), pertaining to tampering protection, are not required to satisfy the requirements of this section. Also, the deficiency provisions of 13 CCR 1968.2(i) do not apply. The deficiency provisions of paragraph (i) of this section and the evaporative leak detection requirement of paragraph (b)(4) of this section apply to manufacturers selecting this paragraph for demonstrating compliance. In addition, demonstration of compliance with 13 CCR 1968.2(e)(16.2.1)(C), to the extent it applies to the verification of proper alignment between the camshaft and crankshaft, applies only to vehicles equipped with variable valve timing.

(k) [Reserved]. For guidance see § 86.1806-01.

(l) *Thresholds for California OBD II Compliance Option.* For the purposes of complying with the provisions set forth above in paragraph (j), vehicles certified to Tier 2 standards shall utilize multiplicative factors from the California vehicle type (i.e. LEV II, ULEV II) corresponding to the Tier 2 to which the vehicles are certified. Vehicles certified to Tier 2, Bin 4 emissions standards shall utilize the Tier 2 Bin 4 emission standards and the CARB ULEV II

multiplicative factors to determine the appropriate OBD malfunction threshold for all pollutants except NO_x, for which they shall utilize that CARB SULEV II multiplicative factors. Vehicles certified to Tier 2, Bin 3 emissions standards shall utilize the Tier 2 Bin 3 emission standards and the CARB ULEV II multiplicative factors to determine the appropriate OBD malfunction threshold for all pollutants except NO_x, for which they shall utilize that CARB SULEV II multiplicative factors. Vehicles certified to Tier 2, Bin 2 emissions standards shall utilize the Tier 2 Bin 2 emission standards and the CARB SULEV II multiplicative factors to determine the appropriate OBD malfunction threshold. Vehicles certified to Tier 2 Bin 7 or higher shall utilize the CARB LEV II multiplicative factors to determine the appropriate OBD malfunction threshold.

[68 FR 35799, June 17, 2003, as amended at 70 FR 75410, Dec. 20, 2005; 71 FR 51488, Aug. 30, 2006]

§ 86.1806-05 On-board diagnostics.

(a) *General.* (1) Except as provided by paragraph (a)(2) of this section, all light-duty vehicles, light-duty trucks and complete heavy-duty vehicles weighing 14,000 pounds GVWR or less (including MDPVs) must be equipped with an onboard diagnostic (OBD) system capable of monitoring all emission-related powertrain systems or components during the applicable useful life of the vehicle. All systems and components required to be monitored by these regulations must be evaluated periodically, but no less frequently than once per applicable certification test cycle as defined in paragraphs (a) and (d) of Appendix I of this part, or similar trip as approved by the Administrator.

(2) Diesel fueled MDPVs and heavy-duty vehicles weighing 14,000 pounds GVWR or less that are not MDPVs must meet the OBD requirements of this section according to the phase-in schedule in paragraph (l) of this section. Paragraph (l) of this section does not apply to Otto-cycle MDPVs.

(3) An OBD system demonstrated to fully meet the requirements in § 86.004-17 may be used to meet the requirements of this section, provided that